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ABSTRACT

The features of content area materials that can be manipulated to improve primary grade content area reading instruction are explored in this paper. Sections of the paper examine organizational patterns, writing styles, vocabulary, and other characteristics of science, social studies, literature, and mathematics materials at the primary grade levels, with suggestions offered for creating activities to improve students' reading skills in these subject areas. A mathematics vocabulary list for use in the kindergarten and first grade is appended. (RL)

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Primary Grade Content Reading:

Why and How

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PRIMARY GRADE CONTENT READING:
WHY AND HOW

Classroom teachers may ask why and how about a suggestion to include content area reading instruction in the primary grades. The development of reading readiness, sight vocabulary, word attack, and comprehension skills already crowds the primary reading curriculum. However, a foundation for content area reading can and should be established in the primary grades, and doing this need not add to the existing reading program. Rather, the foundation skills for later content area reading can be an integral part of primary grade reading.

In order to develop this line of thought some of the characteristics and problems of content area reading will be explored. In general content materials outside of literature tend to be expository. They are information-giving, frequently with a high density in the amount of information provided within each unit of print. The new vocabulary load also tends to be heavy and is complicated by "old words" with very new and different meanings. Another feature of content area reading is the amount of graphic material included and the importance of it to comprehension of the information presented. Few of these features are evident in the basal reader materials that are so widely used in the primary grades.

Science and Social Studies

Specific organizational patterns and writing styles are characteristic in each particular content area. Harris and Smith (1980) state that social studies materials tend to be presented in the patterns of:

1. An initial statement presented
2. Point of view presented
3. Cause and effect relationship
4. Chronological order.

McNeil, Donant and Alkin (1980) consider chronological order, comparison, or cause and effect to be the major writing styles in social studies and they list classification, explanation of a technical process, didactic explanation, or detailed statement of facts as common science organizational patterns. Harris and Smith (1980) note these features of scientific writing for elementary students:

1. A simple classification of data
2. Deductive with a generalization given first, then examples and data or
3. Inductive with data given first then classification and a generalization.

While all this may sound very complex and beyond the level of primary grade pupils, it actually is very closely related to the comprehension skills usually developed in grades one, two, and three. For instance the initial statement, inductive, deductive, and didactic patterns are similar to the main idea-supporting details pattern which is emphasized in basal reader selections. The classification and comparison patterns draw heavily on the compare and contrast comprehension skills while chronological order presentations are, of course, closely related to sequence of events. Teachers can start to develop the skills needed for content area reading by including non-fiction material along with the basal stories and providing skill reinforcement materials appropriate for the content fields.

Probably the best source of appropriate material is the textbook series which are available in the specific content fields. However, many schools do not provide these books for individual pupils in the primary grades. If they are available perhaps reading instruction for one day in every week or two could be given in these materials rather than the basal. A

regular directed reading activity can take place, including vocabulary introduction, background information, guided silent or oral reading, and skill development.

There are many other sources of reading materials appropriate for content areas which teachers can use if textbook series are not available. The important point is to use some non-fiction, expository type material along with the basal readers to provide a variety of writing styles for development of familiar comprehension skills. Some examples of sources readily available for the primary grades are almanacs, non-fiction trade books, newspapers, and pupil developed materials using the language experience approach. Any of these could be used once a week for reading development whether during reading or the content area instruction time. The use of such materials will not only build foundation skills for content area reading in later years, but also will provide variety and motivation in the reading program.

An increased new vocabulary load is typical of science and social studies materials. Helping young children recognize and use context clues is one way teachers can improve vocabulary skills for content area reading and the cloze technique is useful in this area. While this technique is often used in the intermediate grades, some variations were suggested by Blachowicz (1977) as appropriate for younger pupils. Oral cloze can be used as an introduction. When reading out loud the teacher can pause and let the children determine the next word when context clues have made the choice obvious. Zip is another cloze technique for the primary grades. The teacher can provide some material on a transparency with the words to be deleted covered with masking tape. The pupils should read the story silently first. Then the group is to reread it orally, line by line, and decide together on each covered word. The masking tape is then zipped off to reveal the word.

Synonym cloze (Blachowicz, 1977) is another way to introduce the cloze procedure. In this case a synonym is printed under each deleted word to serve as a clue. For example, in the sentence "Ring-necked snakes live in many parts of the country" country is deleted and the word nation is shown under the blank. The commercial material Using the Context by Boning (1962) can be used to provide practice in this important skill. Most of the content presented is non-fiction and levels one, two, and three are included.

Many primary grade teachers use language experience stories in the classroom particularly to record science and social studies experiences. When experiences such as these are dictated, written, read and reread they build vocabulary needed for content area reading.

Another skill area included in general comprehension and also important in science and social studies writing, is main idea and supporting details. At the readiness level when teachers ask pupils to tell what a picture is all about, choose a title for a child's painting, or provide a title for an experience story, main idea is being introduced. Close observation of the details in a picture is also relevant here, particularly if pictures with science and social studies content are used.

The Random Reading Almanacs (Blau, 1979) are supplementary materials useful in content areas and available at third grade level. Each almanac deals with one topic and also one skill. The almanac on animals reinforces main idea in brief non-fiction selections of great interest to children. Some entries are only one sentence or a paragraph or perhaps just a picture with explanatory caption.

A motivating introduction to work with main idea would be to make mobiles. After pupils read short excerpts they can print the main idea on a large card and hang the details from it on smaller cards. A clothes

hanger can be used to provide a base for the mobile. Non-fiction paragraphs could be used for this activity.

The newspaper is an important resource for the social studies and work with this valuable material can begin in the primary grades. Pictures cut from the paper can be used for pupils to write captions for main idea or the captions can be separated from the pictures to be correctly matched. Using a primary grade newspaper written at easier levels than an adult paper provides even more opportunities to work main idea-details skills.

When reading an article, the student can identify who-what-where-when-why-how details. A ditto with these labels for columns can then be filled in. The headline can be used for the main idea if appropriate, or the main idea can be written by the student. Sometimes headlines are not the main idea, but an attention-attractor, so teachers should warn students from an automatic reliance on headlines as main ideas.

All of these activities help to build main idea skill which is a solid foundation for outlining. It is a short step from the mobiles, newspaper pictures, or the chart to a formal outline. Pupils who have taken part in such activities are well prepared for this important task in the intermediate grades.

The ability to compare and contrast using written material is important to both social studies and science. It is also a common writing pattern used in both fields so students should be able to recognize and use it.

The first unit in the second level book of Modern Elementary Science (Fischler et. al., 1971) presents mammals, birds, reptiles, and amphibians. Compare and contrast techniques are used to identify characteristics of animals in each group. By the end of the unit definitions for the words "mammal", and "amphibian", have been developed and the text moves on from comparing and contrasting to classifying.

Primary grade teachers have extensive opportunities to work with comparisons even if such content area textbooks are not used in the classroom. From the kindergarten program, auditory discrimination activities help to build an understanding of the important concepts of same and different. Pictures are used at the readiness level to present information and teachers can ask questions to develop comparison skills.

A learning center could be set up to provide practice to compare and contrast. Many pictures related to science and social studies areas could be included. Empty cereal cartons might also be used to provide some variety in reading material. A ditto form which asks children to note specific features on several cartons would help these young researchers to focus their study. An easy game activity to add to the center requires a Compare and Contrast game board and a set of cards. Each card needs two words that can be compared and contrasted such as dog and cat, trees and shrubs, policeman and fireman, etc. To play the game a spinner or die is used. If an even number is shown the player must tell two things that are alike about the items on the card that has been drawn and for an odd number, two things that are different. If correct the player moves forward the number of spaces shown on the spinner or die.

Classification is closely related to compare and contrast and is particularly important to writing in science. It is a logical step from activities just suggested for compare and contrast, to follow with classification. Picture classifying is frequently done starting in kindergarten with such diverse classes as animals, food, toys, etc. Many sorting activities using blocks or beads for color, size, and shape or pictures for unlimited classifications are common readiness activities for this content area reading skill.

Older primary grade students can classify materials using a bingo game format. Just use classifications at the top of the bingo board such as toys, furniture, vegetables etc. A letter is printed in each space on the grid. Cards for the caller have a category and letter on them, for example Furniture-S or Toys-D. If Furniture-S is called and a player has S on his board under furniture, he can cover it if he can think of a word for furniture starting with S such as sofa. The word must be written down by the player so he will have a list of his words for checking after BINGO is called.

If experience stories are used in the classroom, classifications of words from the stories can be developed. Many lists of words, from those that start with B, M, or T when beginning sounds are emphasized to lists of naming words or action words, can be developed from experience charts.

Cause and effect was identified as a writing style common to social studies materials. In a sequence of pictures from the Follet third level social studies text (Nilsen, 1980) the history of a town from its beginning in the open forest is depicted. The print which accompanies these pictures primarily asks questions and cause and effect relationships are stressed. For example the picture introducing a trader to the Indian village can be used to solicit suggestions for the effects likely from such an event. Construction of the trading post is one effect, but also a cause in turn of further changes. Even more far-reaching are the results of the white settlers, just one family at first, followed by a constant stream of wagons, with the eventual formation of a town and the elimination of the Indian village. Teacher questioning with the pictorial information can emphasize these cause and effect relationships.

Cause and Effect Couples is an activity that also brings out the relationship between causes and effects. For young pupils large cards with

cause and effect statements from beginning reading stories can be used. For example, cause and effect statements from a first reader unit on animal stories that could be used are:

The wolf blew and blew...the pigs' house fell down, or

The food was all gone....Little Bear was crying.

The pupils are to find the correct matching card to make Cause and Effect Couples. This activity could also be done as a puzzle with interlocking pieces for a form of hand manipulative activity.

Concentration is a popular game format that can readily be used to reinforce understanding of cause and effect relationships. Material similar to the previous examples can be used.

Another group of reading skills that is important to science and social studies material relates to the use of graphics. Almost every page in science and social studies textbooks includes some graphic material. The information included in graphics in these content areas is often essential to understanding the written text. In some cases the reader is directly referred to the graphic and questions are posed about it. In other situations the graphics may not be mentioned at all even though they may contain a great deal of important information.

Primary pupils are used to reading illustrative material on a page along with the print. In early primer material in fact they may read most of the storyline from the pictures and picture reading is emphasized in readiness materials. All this introductory work is a good beginning for using graphics in content area reading.

Visuals are also helpful in depicting sequential changes as in a group of pictures of a seed developing into a plant. Children can tell the story that is illustrated and then have it recorded in an experience story. The pictures and story can then be formed into a booklet with a story page facing each illustration.

When step by step procedures are shown with graphic material interspersed with the print on a page, it is easier to understand and follow the directions. Science textbooks frequently present experiments in this fashion. A bulletin board, transparency, or experience chart could be used in place of the textbook to outline the experiment so students could follow the procedures independently.

These are just a few of the activities that can be used in the primary grades to prepare children for science and social studies materials. It is important to include experiences such as these to provide variety from a steady diet of basal reader stories and to build foundation skills for reading in these two content areas.

Literature

Skills used in reading literature are very much related to those fostered in the reading instruction program. An examination of the goals of the literature program, however, reveals some different emphases that will be placed. Goals of the literature program include:

1. Expanding the range of reading interests
2. Fostering positive affective factors
3. Understanding of literary elements
4. Developing an awareness of literary forms
5. Building an appreciation of needs satisfaction through literature.

Literature reading goes far beyond the basic skills currently being promoted, especially those skills stressed in the areas of word recognition and literal comprehension. Reading interests, for example, would include those topics or subject content for which the child expresses a desire to read. With an expanded range of interests students are provided with more incentive to acquire varied vocabulary and concepts through recreational reading.

Evaluative level comprehsnion skills are especially important in the literature program. Asking the question "What did you think of the story?" will seldom be sufficient to encourage judgements about the materials. Opportunities for personal and group reacting and responding, however, will better promote active involvement and critical comparison.

The goal of promoting affective growth includes the reading interest goals. The activities suggested would be appropriate to enhance other factors. The specific goals would include:

1. A positive attitude or favorable disposition toward reading
2. An interest in reading, that is, an active drive to choose or seek out reading as a freely chosen involvement
3. Positive concept of one's self as a competent reader.

Literary elements include many of the story elements stressed in the reading program. These include characterizations, plot, theme, setting, and style. Characterizations are especially stressed in the intermediate grades and can be introduced in the primary grades. For example, the plot and characters can be discussed using a simple device, a concurrent time line. The plot is made up of "the important things that happened in order." When these events are briefly and graphically depicted in a time line it is a simple next step to add the feelings and actions of a particular character. This activity is useful also in pointing out the interaction of the plot and characterizations.

Setting of a story includes its time and place, and students can learn to relate these as essential elements in the story. Style is the author's unique way of writing, and the theme is the message the author is trying to convey to the reader. Style can be pointed out by comparing descriptive passages by different authors which create the same mood or emotion, for example, scariness or loneliness. The theme can be approached by asking "What is the author trying to tell us?" Themes

detected may differ, however, from person to person; therefore, teachers should not be expecting only one appropriate answer.

Literary forms taught in the primary grades could include four simple genre, that is, fiction, nonfiction, biography, and poetry. Fiction and nonfiction differentiation can begin with finding differences between factual and make-believe stories.

The goal of awareness of needs' satisfaction can be acquired in a tacit manner. This is an example of a worthwhile objective being achieved without direct instruction. Needs of young children include achievement, acceptance, security, and recognition. Moore's The Little Raccoon and the Thing in the Pool (1963) is a book in which students can identify with the little raccoon who overcomes a fear in order to achieve a goal he wants badly. A follow-up discussion after reading or listening to this story will allow children to relate to the little raccoon's fears and experience, vicariously at least, a share of his success and achievement.

The goals of the literature program can be stressed in many ways without explicitly stating objectives. It is suggested that teachers, however, become aware of the literature program goals so that this content area may become an even more important part of the primary grade curriculum.

Math

Reading in the math content area places many demands on students. Math has become more than counting and performing simple computations. An element crucial to the child's success in math is acquisition of appropriate language. Successful reading in math is based on a strong listening vocabulary containing similar and related words. This listening vocabulary must include the words which teachers use in giving directions orally and in explaining new concepts.

Teachers' manuals, on levels for kindergarten and grade one, contain suggested explanations which include words and phrases such as addend, joining, worth, line segment, solve, and simple closed path. A more complete listing of these words and phrases, selected from six math series, can be found in the appendix. These words and phrases make up much of the communicative system through which teaching and learning occur. The child's accuracy and facility in dealing with these language units and with the concepts they convey will greatly affect subsequent math achievement.

Math words can be classified under specific types. Paraphrasing terms used by Sheperd (1978) one may describe these types as technical, specialized meaning, process signals, and general.

Technical words and phrases are those not found in other contexts. They will not be encountered in other subject areas, for example. This category might include compute, o'clock, addend, least, and line segment.

Specialized meaning words and phrases are those that have a meaning in math different from that usually associated with it. This category might include the words braces, cone, edge, frame, match, point, and differences.

Process signals are terms that provide clues to the operation to be performed. Included in this category are the words times, multiply, addend, and difference.

General words also aid students' comprehension in perceiving relationships, quantities, or concepts, for example. Included in this catgory might be of, before, together, and left.

These categories are not discrete and there are many words which could be placed in multiple categories. The relevant point, however,

is that the child has to understand the language of mathematics if he is to accurately listen or read and then perform a subsequent math task.

Symbols

The written language of math includes many ideographic symbols which have to be comprehended. These symbols and signs are communication tools as are words and phrases. Unlike words and phrases, however, ideographs do not utilize the alphabet to encode oral language equivalents. Dealing effectively with the symbols requires that the student have some specific competencies. These competencies include:

1. Associating a word or phrase with the symbol
2. Expressing an idea in objects, pictures, and symbols
3. Having an awareness that many symbols have multiple meanings.

It may be helpful to share with students symbols and their word counterparts in many contexts. For example, the ideographic symbols and their matching alphabetic symbols (i.e., words) could be taught prior to the symbols being used in word problems. These written pairs might include = and "equal", $>$ and "is greater than", and + and "plus".

In the early grades a demonstration of the addition process, for example, could be accompanied by an oral explanation as the teacher manipulates objects. A repetition of the process could be done as the teacher verbalizes and writes the computation using symbols. A third demonstration would be similar to the second except the written steps would use words. In this teaching activity students are given the opportunity to see the process performed, hear it described, and see the computation written with both symbols and words.

Independent practice activities might include matching puzzle pieces that fit together when symbols and words are correctly paired. Another

activity might be "Dress The Clown Twins." Bowties are made for the clowns; one bowtie would have symbols and the other would have the word equivalents for those symbols. The child can self-check his matching if the bowties are coded on the back with a color or letter. The twins would be appropriately dressed alike if one wore a tie with "2 + 2" while the other wore a tie with "two plus two."

Word Problems

Vocabulary comprehension, symbol interpretation, and strong general reading skills are needed before a student can reach high achievement in word problems. However, mastery in these three instructional goals and strong computational skills will not ensure success in word problems. The separate skills must be applied in a unique way which is based on the students' thinking and reasoning abilities. Specifically, students must be able to find the main idea and the supporting details within the word problem. Then they must organize these comprehended parts and use them as they follow directions in solving the problem.

Main idea identification is essential to successful completion of word problems. This process involves identifying or developing a question which provides clues to the operation to be performed. The student needs to ask "What do I have to find out?" A suggested activity to aid in this process would be the utilization of the word problem written as a newspaper article. Each student would be asked to write a headline for the article which summarizes the main idea in question form.

Supporting details are the givens or the conditions with which the word problem operation is performed. The supporting details can be identified by asking "What facts are given that will answer the problem questions?" These facts could be identified in the sample word problem and marked as they are used in the computation.

Ability to note irrelevant details in the word problem is also important. Without this ability students will be using some incorrect data in their computation. Irrelevant details can be noted as facts not needed to answer the problem question. If the supporting details are marked as the computation is done, the irrelevant details will be easily identified as those facts which were not used.

Following directions is a skill which requires the student to comprehend and apply other reading and computing skills in a sequential procedure. This task is made more complex by the fact that steps may have to be inferred and that accuracy in sequence is crucial. Many activities and teaching strategies for improving word problem understanding can be utilized emphasizing the sequential steps used to solve the problem.

Talking through a problem while noting the computational steps can be helpful. The teacher can number the steps as the class works through the problem. The students can dictate the steps in their own words as the teacher records these rewritten directions. This activity should be tried initially with very simple tasks in which steps are explicit.

Pictorial and Graphic Materials

Pictorial and graphic materials frequently present difficult reading tasks for the student. Many mathematical ideas are compacted into a small amount of space. Skill development in this area, as in all areas, should begin on a very simple level. Burns and Roe (1980, p. 261) describe four graph types, from simple to complex in difficulty level: (1) picture; (2) circle/pie; (3) bar; (4) line.

An introductory activity in developing graph reading could include making a graph of class or student characteristics. The students could relate to a graph representing their heights, weights, or eye colors, for examples. Once the graph has been started there are some suggestions to

keep in mind for improving understanding and later transfer of learning. A title should be added to the graph with the explanation given that the title tells what the graph represents. Vertical and horizontal lines are then labeled; other data are also carefully described with letters and numbers. A final review of the title and labels could be used to check for accuracy of the information on the graph.

After the class has had experiences with their own graph, a similar graph can be found and used to review specific questions. Frequent reviews of the purpose of a graph will enable the students to value graphs and to read them efficiently.

Lapp and Flood (1978, p. 387) recommend five steps to graph analysis:

(1) read descriptive phrases;

(2) study given numbers and letters that tell what has been measured;

(3) read any column of data to gain an understanding of what is being represented;

(4) analyze any pictorial representations and convert them to numbers; and

(5) compare and draw conclusions.

In summary, reading in math can be facilitated by helping each student develop specific competencies. Understanding the language of math requires comprehension of vocabulary and interpretation of symbols and signs. Solving word problems is accomplished by analytical and computational skills. Utilized in word problems are specific reading skills of finding the main idea, identifying supporting details, and following directions. Successful reading experiences in math utilize the competencies of interpreting graphic and pictorial representations.

Conclusion

Included in this explanation, have been some hows and whys of primary level content area reading. Essential reading skills have been described in a variety of contexts which build upon and extend beyond basic reading programs. Primary grade teachers who include content area reading in the instructional program will better prepare their students for subsequent learning tasks in the intermediate grades.

Appendix

MATH WORDS, Kindergarten and Grade One

ADD
ADDEND
ADDITION
AFTER
AFTERNOON
ALTOGETHER
ARROW
AS LONG AS
AS MANY AS

BALL
BEFORE
BEGIN
BIG, BIGGER
BOTTOM, TOP
BOX
BRACES

CALENDAR
CAN
CENT
CENTIMETER
CHANGE
CIRCLE
CIRCULAR
CLOCK
COIN
COLUMN
COMING
COMPARE
COMPUTE
CONE
CONGRUENT
CORNERS
COST
COUNTING ORDER
CUBE
CUP

DEGREES
DIAGONAL
DIFFERENCE
DIGIT
DIME
DOWN, UP
DOZEN

EACH
EDGES
EIGHT
EMPTY
EMPTY SET
END POINT
ENOUGH
EQUALS
EQUAL SETS
EQUAL TO
EQUATION
EQUIVALENT
ESTIMATE
EVEN NUMBER

FACES
FALL
FEWER
FEWEST
FIRST
FIVE
FOUR
FRAME
FREEZING

GETS
GRAPH
GREATER THAN
GROUP

HALF
HALF PAST
HOUR HAND

IN
INCH
IS GREATER THAN
IS LESS THAN

JOINING

LARGER
LARGEST
LEAST
LEAVING
LEFT, RIGHT
LESS
LINE
LINE SEGMENT
LITER
LITTLE
LONG, LONGER

MANY
MATCH
MEASURE
MEMBER
MIDDLE
MINUS
MINUTE HAND
MISSING
MORE
MORNING
MOST

NEXT
NINE
NONE
NOTHING
NUMBER
NUMBER LINE
NUMBER OF THINGS IN SET
NUMBER NAME
NUMERAL

O'CLOCK
ODD NUMBER
OLD, OLDER
ON
ONE
ONE FOURTH
ONE GREATER THAN
ONE HALF
ONE LESS
ONE MORE
ONE THIRD
ONE TO ONE
OPEN PATH
OPEN SENTENCE
OPPOSITE
ORDER
OUT

OUTSIDE

PARENTHESES
PART
PATH
PATTERN
PAYS
PENNEY
PIECE
PINT
PLUS
POINT
POUND
PRICE

QUART

RAW
RECTANGLE
RECTANGULAR
REGION
RISE
ROUND

SAME AS
SAME LENGTH
SECOND
SEGMENT
SEPARATING
SENTENCE
SET
SETS OF POINTS
SEVEN
SHORT, SHORTER
SIDE
SIDES
SIMPLE CLOSED CURVE
SIMPLE CLOSED PATH
SIX
SKIP COUNT
SMALLER
SMALLEST
SMALL
SOLVE
SPHERE
SQUARE
SQUARE CORNER
STANDARD UNIT
STRAIGHT PATH
SUBSET
SUBTRACT
SUBTRACTION
SUM

TAKE AWAY
TALLEST
TALL, TALLER
TALLY MARKS
TEMPERATURE
TEN
THERMOMETER
THREE
TIME
TODAY
TOMORROW
TRIANGLE
TWO
TWO-DIGIT NUMBER

UNIT

VALUE

WEIGH
WEIGHT
WHOLE
WORD NAME
WORTH

YESTERDAY
YOUNG, YOUNGER

ZERO

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